Contributions of instructional design and Learning Design to pedagogical work organization

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Abstract: In this paper, we describe the contributions of instructional design and Learning Design approaches to pedagogical work organization. By using qualitative research approach and theoretical-descriptive perspective, we compare theoretical and practical framework of instructional design and Learning Design in a Brazilian case study, which contemplates all of instructional design processes – since planning, design, implementation, execution and evaluation until formation and continuing evaluation of acting teachers. The case study also encompasses didactical material production and complementary actions of academic research, under a contextualized point of view. As results, we reflect about Learning Design benefits and challenges, and its contributions to innovation in educational technology field.

Keywords: Instructional Design, Learning Design, Pedagogical Work Organization, Virtual Learning Environment

1. Introduction

Urgent changes of teaching-learning paradigms demand constant data update, and acquire signification when they build bridges, on one hand, between what it is learnt in the formal education actions and contemporary life needs; on the other hand, between what it is learnt with life in work experience and necessary abilities for permanent update of professional competence. Nowadays, such challenge is possible in a large extent by the incorporation of communication and information technologies to educational processes.

National geographic dimensions and the requirement for alternative solutions to citizenship constitution and work formation justify the existence of projects that use virtual learning environments, multimedia interactivity tools, and fast access
to global and/or local contents, in order to establish permanent dialogue, continued knowledge construction and insertion in professional world.

This panorama requires urgent studies to integrate all these media in benefit of teaching-learning process. When becoming hypermediatics, internet is a privileged communication way between educators and students as well as between the own students, since it allows congregating the writing, the speech, and image with rapidity, flexibility, and interaction up to now not imaginable for us.

Face to the quick evolution of technological processes, it is completely necessary to understand how these technologies contribute for effectiveness of learning processes.

Thus, following an explosion of virtual learning environments, also called LMS (Learning Management Systems), systems integrated by administration, coordination, and communication tools applied to education, LCMSs (Learning Content Management Systems), appear with distinct storage focus and available of those ones called reusable learning objects [3, 18, 19, 23, 25].

However, although the emphasis is dislocated from integration of tools (in LMSs) to creation, storage, and recovery of educational contents (in LCMSs), it is known the technology destined to learning do not give yet an accounting of all involved complexity in teaching-learning process (namely, diversity of pedagogical approaches, adopted strategies and techniques; diversity of contexts; specificity of knowledge domains).

This complexity holds the very instruction principles that distinguish the instruction from other fields as information or communication. It elapses from this fact that the essence of education – the determination of learning objectives, personal and collective orientation, praxis and evaluation [16] – is still lack of compatible technological attention.

It is reaffirmed the prominence of tools, which support pedagogical work organization, more specifically everything related to planning, design, development, implementation, and evaluation of activities as well as learning environments, in an sole expression – instructional design.

If traditionally the instructional design field is focused in designing of digital devices (parts, up to now concretely, undertook as plans of course, units, and classes), the design of learning environments, supported by virtual planning, design and execution tools go to representation of all elements and processes involved in teaching-learning [14].

Thus, we deemed that, to be contextualized, instructional design assumes the participation of apprentices and educators as subjects of the process. Under technological point of view, taking decision implies to incorporate tools that reflects the essential principles, processes and competences of contextualized instructional design to effective appropriation for all involved actors.

Since “builders” start to appear, providing to educators those tools for organization and representation of these processes, it becomes unquestionable necessary to explicit such premises in articulated pedagogical models. In this
explicitation, multiplicity and heterogeneity are evidenced in educational praxis, which disclose as diverse as contexts in which they are put in.

Nevertheless, when it is about education supported or mediated by technologies, it is necessary to communicate the praxis in a more objective approach, and preferentially by using a consensual language that can be understood universally by human beings and machines, also handling benefits of interoperability established by the view of learning objects.

One of these languages is EML (Educational Modelling Language), developed by Open University of Netherlands (OUNL), at the end of 1990s, in order to integrally describe an ample variety of processes and existing pedagogical models – it means, not only its content but also rules, relations, interactions, and activities occurring between educational process agents [2, 24].

EML formed the base for IMS Learning Design 1.0, approved as specification on February 10th, 2003 by IMS Global Learning Consortium, a non-profit organization, whose objective is to support adoption and use of learning technology for the whole world [11, 12, 13, 26].

In spite of involved questions in integral adhesion to a specification, such as IMS Learning Design, what interests us is the generic approach backwards this specification, which aims at capturing the teaching-learning process more than contents. It is in this research field this article is situated: to investigate instructional design and Learning Design approach contributions for pedagogical work organization.

2. Objective and research hypothesis

In order to investigate instructional design and Learning Design approach contributions for pedagogical work organization, we undertake a theoretician-descriptive research, whose first phase included a bibliographical reference exploration, and available technological tools investigation, followed by the case study of STEA – Transversal Teaching-Learning System that employs technological resources in education support.

Therefore, this research hypothesis is about the confrontation of theoretician-practical beddings of Learning Design approach with pedagogical work organization accomplished in a national teaching-learning system, which is anchored in explicit pedagogical bases, ripened through two decades of research and praxis. With proven effectiveness, this system contemplates all educational processes – from planning, design, implantation, execution, and evaluation until formation and educators’ continued update, also enclosing internal production of didactic material and complementary actions of academic research and university extension, everything under a contextualized perspective.
3. Development

In educational technology scene, at the beginning of 2000s, several critics to a view centred in tools or contents privileged by LMSs and LCMSs are fortified. It is argued that just to make available tools or to create repository learning objects carefully selected, produced, and monitored do not mean to promote a quality learning. In special, the own consumption of static contents favours a model of self-instructional study that does not reflect the methodological diversity propitiated by educational technologies. It is due to more and more virtual learning spaces is resembled to communities, places in where questions can be formulated and be answered, in where information can be collected and be offered, in where real people interact, learn together, exchanging orientation and inspiration [24].

Pedagogical meta-model creation has been stimulated to take care of variety of theories and applications in educational area, extracting from didactic situation the elements common to any-and-all teaching-learning action. This meta-model was translated into an educational modelling language (EML – Educational Modelling Learning), developed by OUNL in 1997, since search of more than one hundred pedagogical approaches [15].

From this framework, IMS Learning Design specification has appeared describing learning scenes presented on-line and shareable between systems and people. According to IMS Global Learning Consortium [11], it is about a notational system that specifies “a time ordained series of activities to be played by students and educators (roles), in the context of an environment constituted by learning object and services” (page 50).

The specification follows standard SCORM (Shareable Content Object Reference Model) applied to learning objects, and that is characterized for its abrangence, completeness, formalism and interoperability. It describes students and educators activities (individually or in group), it allows the inclusion of resources (medias) integrated to learning and the association of digital contents, as well as it intends to support design of any pedagogical approaches, also the ones that apply to face-to-face learning situations. Additionally, the specification favours the design transference between different systems, reuse (partial or total) of learning designs and materials, internationalization, accessibility, tracking, rendering of accounts, and analysis of performance [9, 26].

However, due to necessary formalization so that machines and systems understand and support educational process, the challenge is to minimize the need of super-specialized instructional design. This can be achieved by use of an intuitive, transparent, technological interface, and by educators and other participants’ effective process qualification, in such a way these do not only benefit activities and well produced learning objects but they are capable to create them, to adapt them, and to reuse them in accordance with application context [1, 7].
In discussion field of instructional design, we testify a movement in favour of “situated, “flexible”, “reflexive and recursive” or simply “constructivist” instructional design [6] that is supported in a described educational paradigm as emergent [17]. In this paradigm, learning is characterized not only for the greatest student autonomy but also for the greatest emphasis in active learning, with creation, communication, and participation of students in assuming key-roles that almost disturbing the distinction between educator and student.

Such movement leads to a contextualized pedagogical work organization that searches the balance between automation of planning processes [5], personalization and contextualization in didactic situation [4] described as contextualized instructional design [6, 10].

4. Description of research field

Seeing that teaching-learning system we analyze in here an instrument of pedagogical work organization as well final didactic material presented to students, it is characterized as a particular example of contextualized instructional design, because of its complexity, systemic and dynamicity view.

Some STEA characteristics qualify it to be dealt with as a particular case of contextualized instructional design in which can be verified underlying principles to Learning Design approach [7]:

- The public-target is formed by adults who, in spite of basic or inexistent scholarization, had built a familiar, professional, and social life; therefore, being capable to take decisions in relation to their future.
- As a matter of principle, the system offers to students the possibility of a choice between different models of teaching-learning: self-study and in group study, with educators’ support.
- Moreover, models are enough flexible so that students can alternate between them along years of study in which it is allowed to them to complete the program.
- The complete official curriculum is presented in modules and thematic units grouped by curricular axes, which can be explored by students in the order seems to be more convenient or more attractive to them, always having the possibility to ask everything to an educator whenever necessary.
- Didactic materials are characterized as answer sheets templates that conserve pedagogical principles of Freirean approach about which the Episode/class is constructed or revised annually by educators’ team (see Figure 1).
Andrea Filatro and Stela Piconez

- Educators – students of licensing courses – are also subjects of their learning processes, and to reflect about related theoretical premises to education and learning is part of their action of planning.
- The system keeps a parallel program for educators’ formation. In collective meetings, pedagogical approaches, legislation, elaboration of didactic material and questions of educational praxis are discussed, enclosing an articulation cycle between theory, praxis, and theory that makes possible the improvement of didactic materials, and educational action during its implementation.
- The development of thematic fiches that compose the system follows fractal logic: educators of different knowledge areas contribute so that each fiche, independently of specific treated subject, functions as a reduced copy of the ampest proposal. In consequence, in all thematic units, the care with Portuguese Language, with ethical and aesthetic aspects and meta-cognition, multiplies. Moreover, design of thematic fiches contains in itself contextualization ideas, once it always propose the survey of students’ previous concepts from which pedagogical proposal is adjusted during didactic situation. Design still privileges the interdisciplinarity when reserving space for different knowing fields that relate to the main treated subject.
- Students have autonomy to explore these learning spaces, due to that does not have an obligator ordinance to explore different fields of Thematic Fiches, even so its disposal in printed pages obeys rigorous principles of spatial organization of information according to theory of cognitive overload.
• The system also constitutes a repository of didactic materials that can be consulted in proposal of new learning actions or new editions of programs already implemented.

• System accomplished in space of an in-distance learning nucleus joined with School of Education, playing triple university function in teaching action, searches and extension. In this sense, it congregates interests, competences, and solutions of different communities involved in teaching-learning processes – educators, students, researchers, developers of didactic materials and institutional managers. It functions as a microcosm that allows analyzing potentialities and limitations of Learning Design approach for pedagogical work organization.

Although search focus is STEA, it is necessary to understand its extended context. Licensed students from School of Education participate of Professor-Trainee’s Formation Program, and execute the politician-pedagogical project of the program. These two programs make part of a nucleus of educators’ education and formation that concentrates research action in graduation degree. Still in activity field of university, where system is inserted, there is a department that patronize in distance courses of basic and average levels of education, both recognized by State Educational Council. Its more recent demands have resulted in the development of a portal and a system for transversal content management, completing in this way a learning scene that allows us articulating in an enough ample way the Learning Design with contextualized instructional design.

5. Search results

Although instructional design and Learning Design processes are not explicit, in pedagogical praxis supported by technologies, we can affirm STEA followed generations of in distance learning, mainly in used medias (printed material, video, Internet) [7, 20, 21, 22].

Along its development and use, the system prescinds from virtual learning environments for the execution of administrative functions, such as school inscription and students’ monitoring, whose functions were carried out by means of not-integrated, commercial software. Moreover, in prioritizing the use of resources, the need to develop a portal to store and to available dynamic information referred to actions of high school course has preceded the requirement to adopt a LMS.

As a tool of authorship and publication, the system of transversal management of contents (SIGEPE) became an alternative for the limitations of available LMSs and LCMSs but without the concern to adhere the meta-data patterns that characterize the managers of contents, or educational interoperability patterns represented by IMS Learning Design in here.

STEA builds in a proper, pedagogical model decurrent of conceptual delineation that embraces objectives, organization of contents and methodologies related to different knowledge domains. The elaboration of such model originated
from particular educational needs of two communities with distinct learning characteristics: the young of e adult learning (to high school course) and the formation of acting educators-trainees.

Pedagogical approach, which the system is based on, is clearly declared and permeates its all documentation and praxis: Piaget and Vygotsky’s socio-constructivists theories, Ausubel’s studies about students’ previous knowing organization, Paulo Freire’s conception of autonomy and freedom, typology of conceptual, Zabala’s procedural and behavioural contents, and Knowles’ andragogy perspective underlie the taking decision during teaching process [20, 21, 22]. This understanding of educational phenomenon, recorded in the pedagogical project, translates in a flexible instructional design, based on Episode/class allowing the convergence of varied pedagogical strategies.

In what’s referred to adhesion to a pedagogical meta-model deed of division as EML or Learning Design approach, the system also works under a conceptual model of activities disposed in elementary learning units (Thematic Fiches) functioning in a learning scene, a species of “structuralized history” (the Episode/class) (Figure 2).
We must highlight that in analysis system the connections between learning units are not given in prerequisite terms but in hyperlinks that establish relations between thematic units of a same discipline and between distinct curricular axes. It means, even so thematic units that compose high school course are identified by a numerical order; the student can freely explore the hyperlinks since they are all available for access by portal.

As for internal structure of learning activities, represented by different Thematic Fiche fields, STEA recommends a sequential exploration in spite of its construction and hyper-textual visual disposition. Daily pre-sequential of teaching-learning activities is also expressed in distribution of fields in the front and reverse of Thematic Fiches. If in the frontal part, the focus is in data collection (in project language, in subject problematization); the reverse is dedicated to learning systematization, while Task-Sheets function as support for record of students’ activities.

Although in STEA scope of the does not exist the figure of classic instructional designer, the existence of an instructional intelligence of design in the system is unquestioned. Either because any learning praxis has an underlying learning design, either because the assumed pedagogical conceptions are translated in visible products – originally Thematic Fiches, and in a posterior phase the incorporated technological resources to the system –, the system holds processes and decisions of instructional design.

In macro level, it has to consider instructional design work consolidated by scientific coordination in Thematic Fiches of Pedagogical Support that function as answer sheets templates for planning and design, being also used in the phases of episode/class execution – a solution formatted on the basis of specific context of research and in distance learning praxis. The structure of predefined fields according to Freirean approach serves as starting point for educators’ planning and didactic material micro-design, biennially reorganized to each new educator-trainee group who bind to of young and adult learning program.

In micro level, a multidisciplinary team carries out the classic instructional design processes for each Thematic Fiche – analysis, design, development, implementation, and evaluation of solutions. It is perceived in the concern about used language, in internal information organization to each thematic unit and between disciplines, in the definition of learning objective and competences to be developed in all units in spatial preparation for meaning construction by students.

The contextualization of instructional design processes of in STEA can be also explained by the description of used media along its existence as in distance learning modality. When processes of Thematic Fiche production were exclusively focused to printed media, it was necessary to work with an instructional design focused to products, once complete Thematic Fiche set needed to be ready at a determined moment in order to be directed to graphical reproduction and distribution to students. These restrictions of production costs and terms had created a culture of planning, design and previous revisions to
execution of the episode/class preserved after the incorporation of digital technologies.

With the incorporation of digital technologies to didactic material production, the system could extend the original concept, establishing instructional design in the template level in order to conserve the definite pedagogical approach in a macro level, and keeping opened instructional design of learning units and activities (thematic units and Thematic Fiche fields), adapted to each new context of use.

This characteristic easily transforms the system migrable to Learning Design after doing the necessary conceptual adjustments to programming in authorship tools, publication, and execution (see Figure 3).

Figure 3 STEA episode/class instanced in a Learning Design tool (Reload Player).

What lacks to Learning Design approach is to incorporate the possibility of on-the-fly (during didactic situation) adaptations by context participants, a differential in young and adult learning that cannot be excused by dint of final results.

6. Conclusions

Learning Design approach, when focusing teaching-learning processes (centering in learning activities) more than contents (as it occurs in learning object approach), opens a way in direction to instructional design contextualization as describes executable on-line learning scenes able to share between systems and people.

In fact, LD can be considered a source, an unfolding or even a specialization inside instructional design field for electronic learning, though at least in the
current temporal outline, relations between two research fields is more characterized by LD in relation to DI theoretical approach than the inverse way.

After these considerations, we admit Learning Design approach as a set of valid theoretical beddings is capable to represent the most part of pedagogical approaches – at least those intentional, objectified, measurable ones –, and it is also capable to represent different instructional design models, particularly DIC, once that offers affordances for flexibilization and contextualization.

Nonetheless, in practical terms, it has a long journey to cover. If operational processes joined to Learning Design remain as super-specialized tasks as they are nowadays, depending of complex technological tools and difficult manipulation for educators and students, they can compromise its fast adoption by practitioners, making the alleged benefits to reuse and sharing of pedagogical praxis difficult or impracticable.

References


